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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,110	12/15/2003	Russell Childs	Q78999	4858

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EXAMINER	
KIM, JOANNE H	

ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/734,110	CHILDS ET AL.	
	Examiner	Art Unit	
	Joanne H. Kim	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *19 and 20* is/are allowed.

6)☒ Claim(s) *1,2,5-8,10,11 and 13-18* is/are rejected.

7)☒ Claim(s) *3, 4, 9, and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 December 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/15/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The priority under 35 U.S.C. 119 (a)-(d) is acknowledged. However, since the Examiner is unable to verify whether the certified copy of the priority document has been received at this time, the Examiner indicates in the Office Action Summary that only some of the conditions for the priority under 35 U.S.C. 119 (a)-(d) have met. The Examiner will verify the status of the certified copy of the priority document and the correct status of the certified copy will be indicated in the next Office Action.

Drawings

2. The drawings are objected to because Fig. 4 includes an incorrect reference number. In Fig. 4, the reference number 1 should be 100. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the

changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informality: through out the specification, ":m" should be "μm."

Appropriate correction is required.

Claim Objections

4. Claims 1, 2, 13, and 14 are objected to because of the following informalities:

in claim 1, line 5, "the complement" lacks antecedent basis;

in claim 2, line 6, "form" should be "from"; and

in claims 13-14, line 2, "the waveguide width" should be "the width of the waveguide core."

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims1, 2, 5-7, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soref (U.S. Patent No. 5,838,870).

Soref discloses an optical device and a method of fabricating the optical device comprising: forming a first cladding layer on a silicon substrate; forming a core material layer on the first cladding layer; etching to form a waveguide core, the etching step removing material from the core material layer and material from the first cladding layer so that the first cladding layer forms a mesa formation covered by the waveguide core; and forming a second cladding layer over the first cladding layer and the waveguide core, wherein the first cladding layer is predominantly silicon dioxide, the cross section of the waveguide core has a square shape, and the width of the mesa formation is equal to the width of the core (Figs. 2A and 2B; and column 3, lines 22-34 and 40-41).

Soref also discloses that the first cladding layer structure, which includes the mesa formation, makes possible high Q optical resonators in the waveguide (column 5, lines 29-31). It is well known that Q-value is inversely proportional to birefringence. Therefore, Soref discloses that the mesa formation of the first cladding layer makes possible to provide low birefringence (or reduced birefringence), which indicates that geometry of the mesa formation causes variation of birefringence level.

Accordingly, it would have been obvious to select the height of the mesa formation to reduce birefringence to substantially zero in order to improve performance of the waveguide.

7. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soref in view of Bosso et al. (U.S. Patent No. 6,282,332, hereinafter "Bosso"), and further in view of Kawachi et al. (U.S. Patent No. 4,781,424, hereinafter "Kawachi").

Soref discloses that the height of the mesa formation is selected to provide a substantially zero birefringence in the waveguide as discussed above in paragraph 5.

Soref does not disclose that the stress in the second cladding layer, the stress in the core, and the width of the waveguide core are selected to provide substantially zero birefringence in the waveguide.

Bosso discloses that a width of a waveguide (i.e., a width of a waveguide core) causes variation of birefringence (column 4, lines 29-36).

Kawachi discloses that stress in a second cladding layer and stress in a core of a waveguide induce birefringence (column 1, lines 46-50; column 2, lines 57-63; and column 3, lines 37-39).

It would have been obvious to select all of the height of the mesa formation, the stress in the second cladding layer, the stress in the core, and the width of the waveguide core to provide substantially zero birefringence in the waveguide in order to improve performance of the waveguide since all of the listed parameters cause variation of birefringence.

8. Claims 8, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soref in view of "Birefringence Free Planar Optical Waveguide Made by Flame

Hydrolysis Deposition (FHD) Through Tailoring of the Overcaldding" by Kilian et al. (hereinafter "Kilian").

9. Regarding claim 8, Soref discloses the method of fabricating an optical device as discussed above in paragraph 5.

Soref does not disclose that coefficient of expansion of the material of the second cladding layer is greater than that of the material of the core.

Kilian discloses birefringence free planar optical waveguide. Kilian discloses that birefringence is reduced in a waveguide including a second cladding layer made of a material that has coefficient of thermal expansion greater than that of a material of a core (pages 196-197, second column, lines 6-14, and Table II).

It would have been obvious to modify Soref such that coefficient of expansion of the material of the second cladding layer is greater than that of the material of the core in order to reduce birefringence, thus improving performance of the waveguide.

10. Regarding claim 13 and 14, Soref discloses the method of fabricating an optical device as discussed above in paragraph 5.

Soref does not disclose that the width of the waveguide core is selected to be 6 μm.

Kilian discloses that a width of the waveguide core is selected to be 6 μm (page 196, the first column, lines 18-19).

It would have been obvious to modify Soref to select the width of the waveguide core to be 6 μm since 6 μm is generally used as a width of a single-mode waveguide core.

Allowable Subject Matter

11. Claims 3, 4, 9, and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3, 4 and 9 are allowable over the prior arts of record because the prior arts of record do not disclose nor render obvious a method for fabricating an optical device comprising: a first cladding layer forming a mesa formation having a height of at least 1 μm.

Claim 12 is allowable over the prior arts of record because the prior arts of record do not disclose nor render obvious a method for fabricating an optical device comprising: selecting the stress in a second cladding layer to be in the range of –20 to +10 MPascals.

12. Claims 19 and 20 are allowed.

Claims 19 and 20 are allowed because the prior arts of record do not disclose nor render obvious an arrayed waveguide comprising: a first cladding layer including a mesa formation that is covered by a waveguide core, wherein the height of the mesa formation is in the range of about 2 to 4 μm, and the stress in a second cladding layer is in the range of –20 to +10 MPascals.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Imoto et al. (U.S. Patent No. 4,904,037) discloses a waveguide with thermal compensation layers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joanne H. Kim whose telephone number is (571) 272-2139. The examiner can normally be reached on 8:30 a.m. to 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Joanne H. Kim
Examiner
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jk/FGF

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